SECTION 07530 - ELASTOMERIC SINGLE PLY MEMBRANE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. General and Special Conditions, Contract Drawings, Technical Specification Division 1 and all other related Sections, apply to this Section.

B. Rigid insulation is existing except as indicated on the drawings.

1.2 SUMMARY:

A. Section Includes:
   1. Roof insulation
   2. Crickets and saddles
   3. Elastomeric Ethylene Propylene Diene Monomer (EPDM) single-ply ballasted roofing membrane
   4. Membrane flashing
   5. Penetration flashings
   6. Membrane Protection and Traffic walkways

B. Related Sections:
   1. Division 7 - Sheet Metal Flashing and Trim
   2. Division 7 - Joint Sealants

C. Contract Documents:
   1. All work of this Section shall comply with the requirements of the Conditions of the Contract - Purchase Order Terms and Conditions, General Conditions, Statement of Work, Drawings, Related Standards, State & Federal Regulations and applicable building codes. This includes the even redistribution of the existing river rock ballast and testing as described in this section.

1.3 SCOPE OF WORK:

A. Work Shall Include:
   1. WATER TESTING: Water testing is required at all existing platforms for Rooftop Equipment. The contractor shall first perform a water test on the roof around the platform for testing the roof and the platform flashing. Proceed with the test moving upward to test the metal platform cap. If after this portion of the test is completed and the results are negative, proceed with testing the shell of the unit. The duration for each portion of the test (3 portions) shall be a minimum of 15 minutes or until a leak is discovered. The contracting officer shall be notified of the date and time of testing five (5) working days prior to commencement of the testing. All reports shall have written results and are to be delivered to the contracting officer within four (4) working days of testing.
   2. MEMBRANE REPLACEMENT: Work shall include temporary removal and reuse of existing rock ballast with fines removed, removal and disposal of existing membrane and related flashings, and replacement of damaged insulation. Contractor shall furnish and install a new cover board, new 60 mil EPDM ballasted membrane, new scupper sleeves, expansion joints, counterflashing, and related flashings at all terminations and penetrations.
   3. DRAINAGE: The Contractor shall provide a Slope Survey of the existing roof and provide the Contracting Officer with written report results and recommendations for correcting any deficiencies (ponding, incorrect drainage, damaged substrate &/or damaged insulation, incorrect drainage).

4. INSPECTION: The Contractor shall notify the Contracting Officer for inspection upon completion of demolition work that exposes the existing roof insulation and underlayment. Final Inspection shall be done by the Contracting Officer before and after Final Inspection by the roofing manufacturers designated field representative.

1.4 REFERENCE STANDARDS:

A. Standards.
1. SPRI - Flexible Membrane Roofing: A Professional's Guide to Specifications, latest edition, published by SPRI, a consortium of sheet membrane and component suppliers to the commercial roofing industry.
2. Manufacturer's Roofing Systems Handbook and Specifications.
3. National Roofing Contractors Association, Chicago, IL. (NRCA) Roofing and Waterproofing Manual Construction Details , latest edition.
4. 2000 Uniform Building Code, 1999 Denver Building Code Amendments

B. ASTM - American Society of Testing and Materials, Philadelphia, PA.
1. ASTM C 208 Rigid Insulation, Cellulosic Fiber
2. ASTM D 4637 Vulcanized rubber membranes
3. ASTM D 412 Tensile strength and elongation
4. ASTM D 573 Accelerated heat aging
5. ASTM D 624 Tear resistance
6. ASTM D 1149 Ozone resistance

C. Factory Mutual Research Corporation Loss Prevention Data Bulletins:
1. 1-28, latest edition.
2. 1-28S, latest edition for Wind Uplift Pressures on Roofs.
3. 1-49, latest edition for Perimeter Flashing.
4. 1-52, Field Uplift Tests, latest edition.

D. Safety: The roofing contractor is responsible for being familiar with and enforcing safety regulations, rules and practices as prescribed by, but not limited to the following:
1. Occupational Safety & Health Administration (OSHA). These guidelines shall include but not limited to employing warning lines and a stopping device near roof edges.
2. Code of Federal Regulation (CFR) 29, 1910 & 1926
3. American National Standards Institute (ANSI) Z359.1
4. National Fire Protection Association (NFPA) 241

1.5 SYSTEM DESCRIPTION

A. System No. 1:

Component	Wt./Thickness	Attachment Method	Comment
Existing River-Rock Ballast 2” to 4”	11 to 13 lbs./sq.	Loose laid	Re-use existing River-Rock. Clean and redistribute evenly.
Non-reinforced EPDM membrane	60 mils	Loose Laid	Per manufacturer requirements. Provide 5” cover strips at all field seams and vertical seams in the wall flashings
One layer of high density wood fiber cover board	½" min.	Loose laid	Stagger short joints & stagger long joints from the existing. previous layer by 12" min.

Existing polyisocyanurate Rigid Insulation over metal deck	Approx. 4" (field verify)	Loose Laid	Replace damaged boards with new to match existing. Large gaps to be filled with rigid insulation.

B. Special Requirements: Field seams and vertical wall seams shall be made with 3" seam tape with a 5" wide semi-cured self-adhesive cover strip.
C. All flashing details shall conform to manufacturer's requirements to obtain a minimum 20 year watertight warranty and Contract Drawings.
D. Alternates shall be submitted in accordance with Section 01630.
E. Performance & Design Requirements:
   1. External fire resistance: UL Class A
   2. Wind: SPRI - Flexible Membrane Roofing: A Professional's Guide to Specifications, latest edition, published by SPRI, a consortium of sheet membrane and component suppliers to the commercial roofing industry (SPRI) - Chapter 3 - Design Considerations "Wind Design Guide for Ballasted Single-Ply Roofing Systems", Exposure Category: Exposure C, System Design: System 3.

1.6 SUBMITTALS:
A. General: Submit in accordance with Division 1.
B. Submittals - Submit electronic copy of Manufacturer's Certifications, 20 year warranty, and membrane, recover board, adhesive, and fastener product data sheets. Also submit drawing(s) showing typical installation cross section, typical fastener pattern, and fastener pattern adjacent to parapet, demonstrating system will meet uplift requirements. Reference Instructions to Proposers for deadlines and other requirements.
C. Product Data:
   1. Manufacturer's specifications and recommendations covering roofing system materials and methods proposed.
   2. Manufacturer's job site safety precautions.
   3. Facsimile of the manufacturer's guarantee terms and conditions. Shall include written statement on hail and wind loss provisions.
   4. Specification Data Sheets for roofing materials proposed.
   5. Material Safety Data Sheets (MSDS) for all products used.
   6. U.L. Roofing Materials & Systems Directory Classification Approvals for specified assemblies.
   7. Manufacturer's Roofing Systems Handbook, including application procedures, details, specifications and complete inspection instructions. Roofing operations may not start until this submittal has been reviewed and approved by the Contracting Officer. The Contractor shall be responsible for any delays to the Work due to noncompliance with this requirement.
D. Substitutions: For any items specified as an "or equal" or "approved substitute", Contractor must provide submittals for approval by the Contracting Officer. Contractor assumes all liability and costs associated thereof for installing any item not previously approved in writing by the Contracting Officer.
E. Shop Drawings: Submit in accordance with Division 1. Shop drawings shall Include, but are not limited to the following:
   1. All details not specifically shown in the drawings
   2. Material storage "hot boxes"
   3. Plywood ramps for transportation across roofs
   4. Roof plan annotated with location of details

5. Tapered insulation layout with slope and roof drains
6. Traffic protection and walkways

F. Samples: Submit in accordance with Division 1. Submit samples of each component to be used to construct the roofing system, including but not limited to the following:
1. Each type of membrane and flashing materials.
2. Insulation and recover board
3. Fasteners for, flashings and sheet metal.
4. Sealants
5. Samples of pre-painted sheet metal color chips.

G. Certification Letters:
1. Manufacturer's Approved Contractor: Prior to commencement of project, contractor shall submit manufacturer's written certification that installer is approved by the manufacturer to install guaranteed roofing system(s) with unlimited penal sums as specified.
2. Prior to commencement of project, contractor shall provide a letter from the manufacturer that the system being installed has been tested and meets or exceeds the wind uplift rating as specified. The letter shall provide a description of the testing procedures actually used.

1.7 QUALITY ASSURANCE:

A. Applicator: Company specializing in elastomeric membrane roofing using ballasted application techniques.
1. Installer: Approved and certified by the Manufacturer to install a 20 year NDL guaranteed roof system.
2. Experience: The foreman and mechanics installing the roofing membrane shall be certified by the manufacturer to install a 20 year NDL guaranteed roof system, prior to the start of the project.
3. Pre-Construction Conference: In addition to the Pre-construction Meeting, project Meetings, and prior to beginning the work, the Contractor shall arrange a conference with all of its sub-contractors, Roofing Consultant, Architect and Contracting Officer to review the scope of work, specifications, and Contracting Officer's expectations. Items to be discussed shall include, but are not limited to:
a. Contract documents, roofing details and installation procedures
b. Submittals
c. Coordination of work and responsibility of other trades
d. Staging and waste disposal
e. Weather condition limitations
f. Availability of materials and schedule
g. Requirements for inspections, testing, certifications, governing regulations, and insurance
h. Coordination of Manufacturers technical representative for a post installation roof inspection to ensure that the roof is compliant with the manufacturer’s design, standards, and specifications. This representative is to furnish the Contracting Officer with a report in writing of his findings. (reference para. 1.3.3 sub para. 3and 4 of PART I above)
i. Define details of the requirements for the Slope Survey and establish a designated Sub-Contractor for the work

B. Record of Work: Contractor shall keep records indicating temperature, relative humidity, moisture conditions, wind speed and type and location of work being done during each day of

roofing operations. A copy of the daily record shall be transmitted to the Contracting Officer at the end of any 24-hour period during which roofing operations occurred.

C. Application: Accomplish roofing work with supervisor, foreman, and mechanics thoroughly skilled in the application of the specified materials. Workmanship shall meet industry standards and shall fulfill the requirements of the Contract Documents. Follow specific directions published by the manufacturer, regarding application of their roofing materials, unless the technical specifications are more stringent. Do not deviate from the manufacturer's published instructions without prior written approval from the Contracting Officer.

D. After starting Work, the roofing contractor shall be responsible for complete moisture integrity of the roofing and flashing membrane, and for providing properly applied roof. The roofing contractor shall:
   1. Protect existing membrane and insulation from damage due to foot traffic and material storage.
   2. Establish and follow application procedures and ensure that adequate quantities of materials are being used.
   3. Maintain competent foremen continuously supervising Work, with authority to discard unsuitable materials and remove unsatisfactory workmen from the project.
   4. Observe fire precautions involving storage and handling of roofing materials: Provide adequate quantity of fire extinguishers at work site per Denver Fire Department requirements.
   5. Coordinate the installation of work by other trades affecting the roof, to assure that curbs and penetrations are made watertight and that they meet the minimum requirements of this specification. Contractor shall notify immediately, Contracting Officer in writing of potential leaks as may be caused by other parts of the Work and shall be responsible for correction of the same.
   6. Coordinate all roofing operations daily with the Contracting Officer and other designated Contracting Officer's representatives.

E. Field Supervision:
   1. Maintain a full-time foreman with a minimum of five years experience and accreditations with this type of roofing system on job site during application.
   2. With each roofing crew, maintain a full-time crew foreman with a minimum of five years experience and accreditations with this type of roofing system with the crew on the job site during application.

F. Field Documents:
   1. The contractor's foreman shall have a copy of this specification, all pertinent details and shop drawings and a copy of the Roofing Manufacturer's Roofing Systems Handbook at work site.

1.8 DELIVERY, STORAGE, AND HANDLING:

A. General: Comply with Division 1.

B. Materials that will not be installed in the roof system shall be delivered to an off-site area designated by the Contracting Officer.

C. Materials that will be used within the work week, may be temporarily stored at a designated area as long as they are bundled and tied down to the satisfaction of the Contracting Officer. Any loose wrapping or labels shall be removed to eliminate the risk of debris blowing around the operation areas. From this staging area, materials may be loaded on the roof during specified times that are coordinated with the Contracting Officer.

D. Deliver material in the manufacturer's original, unopened containers with manufacturer's labels intact and legible.
E. Materials shall be stored on pallets and covered so as to protect them completely from damage by the elements and temperatures.
F. Store adhesives, cements, seam tapes, uncured flashing membranes, sealants and coatings in a heated area, off-site, during cold weather above 40 deg. F. and in areas below 80 deg. F. in warm weather. Keep lids tightly sealed to keep volatiles from escaping.
G. Non-flammable materials that are not bundled may be stored in designated penthouse areas or they shall be removed from the site and stored off-site where specified by the Contracting Officer.
H. Roof insulations shall be dry when delivered and when placed in the completed roofing system.
I. Waterproof covering shall be applied in a watertight manner and securely tied during and at the end of each working day.
J. Use of manufacturer's product protection wrapping is not acceptable for worksite type protection, and if required to prevent moisture accumulation, wrapping shall be side-punctured or end-punctured or slashed before covering with canvas.
K. No tears in the protective covers will be permitted.
L. Observe all health and safety precautions published by the manufacturer and stated on the container labels involving the storage, handling, and application of materials.
M. Many of the materials may contain ingredients which can be toxic and extremely flammable. Use only in fully ventilated areas. Avoid breathing vapors. Do not use near heat, sparks or open flames. Observe all cautions stated on labels and material safety data sheets (MSDS).
N. All flammable materials not used during the days work must be removed from the worksite and stored at the off-site storage area.

1.9 PROJECT CONDITIONS:

A. Environmental Requirements: Do not apply roofing during wet weather or when ambient temperature is below 32° F. Take all necessary precautions as recommended by the manufacturer.
B. Waste Products: Do not allow petroleum, grease, oil, solvents, vegetable or mineral oil, animal fat or direct steam venting to come in contact with membrane.
C. Take precautions as recommended by manufacturer with highly flammable materials including cements, bonding adhesives, caulkings, cut-backs, and cleaners.
D. At all times during the application of sprayed-on adhesives and coatings, contractor shall provide wind screens to prevent overspray on to building components and vehicles
E. Protect finished work with 1/2 inch plywood for storing material and temporary traffic surfaces.
F. During cold weather (below 40° F): Contractor shall provide plywood ramps over existing membrane for transporting materials and personnel and shall provide "hot" boxes to store materials to prevent products from freezing.
G. The roofing contractor shall be responsible for verification of all building dimensions, elevations and number and location of roof top units and penetrations.
H. The roofing contractor shall coordinate the installation of mechanical equipment, roof drains, and other items that affect the roof so that units are properly set and the roof is not damaged. Make roof and flashing repairs as necessary and advise the Contracting Officer in writing of all potential leaks that may be caused by other parts of the Work and shall be responsible for correction of same.

1.10 WARRANTY:

A. Manufacturer's Warranty:
   1. Provide a 20 Year written watertight guarantee, with an unlimited penal sum (No Dollar Limit), covering, but not limited to the following:
      a. Materials and installation for total roofing system
      b. Walkpads and their attachment to the roof assembly
      c. Incidental punctures
      d. Sheet metal flashing and coping

B. Contractor's Warranty: Prior to the start of the work under this section, the Contractor shall warrant and submit written certification, in a form subject to the Contracting Officer's approval, that the membrane roofing system executed under this Section will be water-tight and will be free from defects in materials and workmanship for a period of two (2) years from date of acceptance of the Project, and that the contractor, at his own expense, will repair and/or replace all such defective work; and further, that he/she will assume full responsibility for repair and/or replacement of all other work which may become damaged as a result of such defective work, any and all of which becomes defective during the warranty period. The Roof Warranty shall be signed by an officer of the Contractor's Company.

PART 2 - PRODUCTS

2.1 INSULATION:

A. Polyisocyanurate: Rigid board with a foam core and a fiber glass reinforced felt facer. Provide in thickness to match existing. Comply with ASTM C 1289-01, Type II, Class 1, Grade II.

B. Wood Fiber Board Insulation: Rigid cellulosic high density wood fiberboard with a K-value of 0.36, 1/2” thick; asphalt-impregnated surface on six sides; comply with ASTM C 208

C. Wall Sheathing Board: Non-structural glass mat-faced non-combustible, water resistant treated gypsum core panel with dark color facing. Shall comply with ASTM C 473. Minimum thickness shall be ¼”.
   1. Acceptable Products
      a. Dens-Deck Prime by Georgia Pacific
      b. Securock by U.S. Gypsum
      c. Or approved substitute

D. Tapered Insulation/cricket system: Shall be factory tapered and have an effective positive slope of 1/4 inch per foot, except where noted. Crickets shall be covered with a recover board as specified. Acceptable materials are listed below:
   1. Polyisocyanurate

2.2 FASTENERS:

A. Securement strips to steel deck:
   1. Fastener: Corrosion resistant, epoxy coated steel deck fasteners approved by the roofing manufacturer.
   2. Plate: 2-7/8" min. diameter Galvalume (TM) metal plate approved by the roofing manufacturer and acceptable with Factory Mutual approved systems.
   3. The fastener length shall be sufficient to penetrate the steel deck 3/4" minimum.

B. Sheet metal to wood (buried by roofing):

1. FS FF-N-105B(3) Type II, Style 20, roofing nails, galvanized steel wire, flat head, diamond point, round barbed shank.
2. Length sufficient to penetrate wood blocking by 3/4".
3. Acceptable manufacturers:
   a. Fabco
   b. Independent Nail Co., Bridgewater, MA.
   c. Simplex Nail and Manufacturing Co., Americus, GA.

C. Sheet metal to wood (exposed): Stainless steel hex head screws with EPDM/stainless steel sealing bearing washers. Length sufficient to penetrate wood 1-1/4". Maximum spacing shall be 24" on center.

D. Hook Strips to wood:
1. Annular threaded corrosion resistant nails with 3/16" minimum flat head. Nail shall penetrate wood a minimum of 1-1/4", spaced a minimum of 16" on center.
2. No. 8 corrosion resistant screws. The screw shall penetrate the wood a minimum of 3/4", spaced a minimum of 16" on center.

E. Drawband:
1. Gold Seal stainless steel worm gear clamp by Murray Corp., Cockeysville, MD.
2. Power-Seal stainless steel worm drive clamps by Breeze Clamp Co., Saltsburg, PA.

2.3 MEMBRANE:

A. Roofing Membrane: Shall be 60 mil, non-reinforced black Ethylene Propylene Diene Monomer (EPDM) elastomeric roofing sheet for use in ballasted single-ply roofing systems.

B. Membrane Flashing: Shall be 60 mil cured EPDM sheet. For corners, transitions, field wrap flashings and target patches contractor shall use uncured EPDM membrane of the same thickness as the membrane.

C. Membrane Adhesive: Shall consist of butyl-based bonding cement as recommended by the manufacturer for their roofing system.

D. Seam Tape: Shall be peel-and-stick, double-sided butyl sealing strip, 3" wide for sealing lap seams supplied by the manufacturer.

E. Cover Strips: Shall be 5" minimum width semi-uncured EPDM with one-sided butyl sealing strip for cover strips on lap seams supplied by the manufacturer.

F. Target Patches: Shall be uncured 60 mil EPDM self-adhering flashing membrane supplied by the manufacturer.

2.4 PRIMERS, SEALANTS, COATINGS, AND CEMENTS:

A. Lap Cement: Where seam tape is not required, to seal the laps of the EPDM membrane and flashings, contractor shall use butyl based lap cement as supplied by the manufacturer.

B. Bonding Cement: To adhere membrane and flashing to porous surfaces, approved by the manufacturer, shall be butyl-based bonding cement as supplied by the manufacturer.

C. Lap Caulking: To caulk the exposed edges of seams of the membrane (where seam tape is not utilized) and flashing materials shall be rubber-based lap caulking as supplied by the manufacturer.

D. All Purpose Sealant: To seal the exposed edges of termination bars, reglets and other exposed surfaces, shall be 1-part urethane sealant, supplied or approved by the manufacturer.

E. Sealing Mastic: To seal the membrane and flashing to drain flanges and other metal surfaces shall be butyl-based non-hardening sealant as supplied by the manufacturer.

F. Pourable Sealer: To fill roof projection pans and to seal horizontal joints shall be two component urethane self-leveling pourable sealant, as supplied or approved by the manufacturer.
G. Water Cut-offs: To temporarily seal the edges of uncompleted membrane at the end of each work day shall be water cut-off mastic as supplied by the manufacturer.
H. Primer: To prime metal and membrane surfaces prior to the application of cements and butyl-backed flashing materials, shall be supplied by the manufacturer.

2.5 RELATED MATERIALS:

A. Pre-Molded Pipe Flashings: To flash round pipe penetrations shall be pre-molded EPDM pipe flashings as supplied by the manufacturer.
B. Walkway Pavers: Interlocking rubber pavers, 24" X 24" X 2-¼", weighing approximately 6 pounds per square foot. Sure-Seal Interlocking^{tm} Rubber Pavers, manufactured by Carlisle-Syntec, Inc. or approved substitute. To be used in traffic areas as a walkway system on the roof subjected to frequent traffic, including access points, hatches and doorways.
C. Deck Corrosion Treatment: Shall be Conquest polymeric rust converter manufactured by National Chemsearch Corp., 2727 Chemsearch Blvd., Irving, TX 75062. Tel. 1-800-527-9921. FAX: (214) 438-0805 or approved substitute.
D. Accessories: All accessories, including but not limited to termination bars, anchor bars, edge flashings, steel deck fasteners, plates, fasteners and sealants shall be supplied by the Manufacturer and installed by the Contractor for a total system.
E. Dow Corning 123 Silicone Seal Joint Sealing System

PART 3 - EXECUTION

3.1 INSPECTION:

A. The Project Manager may designate other representatives for the Contracting Officer to inspect the roof system continuously during installation and to perform a final inspection. The Contractor shall advise the Contracting Officer in advance of when he/she plans to start the roofing installation and of all changes from that schedule.
B. General Substrate Inspection:
   1. Verify that all work that requires penetrating the deck, or that requires people and equipment to travel over the roof deck has been completed.
   2. See that all surfaces are adequately anchored, even and free of any foreign material or moisture.
   3. Immediately notify the Contracting Officer's representative of any defects or damage to the substrate. Do not apply the roof system until these defects have been corrected.
   4. Verify that all curbs and nailers are in place and properly installed.
C. Prior to commencement of work, Contractor shall inspect roof for ponding water in excess of manufacturer’s limitations. Areas considered unwarrantable due to ponding shall be corrected by Contractor by enlarging crickets and sumps, increasing the roof slope with tapered insulation boards, lowering the roof drain(s) or other means acceptable to the manufacturer and the Contracting Officer.

3.2 JOB CONDITIONS:

A. All existing work including roofing membranes shall be properly protected from damage or soiling.
   1. Protect exterior wall surfaces from material spillage.
   2. Protect interior plant operations and personnel from debris, dust and fumes at all times.

3. Close off air intake vents when applying adhesives and coatings in the vicinity of the work areas. A system shutdown request is required prior to closing any air intake.
4. Close off air intake vents when applying adhesives and coatings in the vicinity of the work areas.
5. Contractor shall secure all vent stacks and duct work prior to removing the existing roofing materials to avoid displacement or damage to the pipe or vent stack.
6. Contractor shall be responsible for security when opening the building for roof projections and/or curbs.
7. Storage and work areas shall be confined to the areas designated by Contracting Officer.
8. Any damage done to the Contracting Officer's property shall be replaced or restored to the original condition by the roofing contractor at his own expense.
9. The roofing contractor shall protect the existing and new roofing membrane with plywood as necessary. Any damage to existing roof shall be repaired until replaced by the roofing contractor at his/her expense.

B. Weather Condition Limitations: Proceed only when existing and forecasted weather conditions will permit in accordance with the requirements of this specification.

3.3 REMOVAL OF EXISTING ROOFS:

A. The existing roofing membrane shall be removed and disposed of. Unless indicated, remove and dispose of all base flashings, edge flashings, coping, penetration flashings and all other items incorporated therein. No more roof shall be removed than can be protected and made watertight by the completed roofing membrane in any work day or work period.
B. Contractor shall protect the rigid insulation from heavy foot traffic and storage of materials. Any insulation board that is wet or damaged shall be replaced with new product to match existing thickness.
C. The roofing contractor shall exercise care to prevent damage to the existing deck and must replace or repair, at his/her expense, any roof deck that he/she damages.
D. Remove any deteriorated (decayed, wet, split) wood nailers down to firm base and replace with new treated wood nailers to match existing.
E. Remove and dispose of existing roof jacks, pitch pans, metal flashings, wall flashings, counterflashings, scuppers, and similar metal items.
F. All debris shall be bagged and removed from roof and deposited into an enclosed trash bin, truck or containers to be removed at the roofing contractor's expense.
G. The roofing contractor shall be responsible for keeping the building roof and surrounding area in a neat, orderly, and secure condition.
H. Clean the roof surfaces of all loose material and other impediments that will be detrimental to the application of the new roofing materials.
I. Any deck deteriorated beyond repair shall be replaced before re-roofing, with material to match existing. The contractor may request compensation as allowed by the contract.

3.4 WORKMANSHIP:

A. General: Perform work in accordance with the manufacturer's recommendations, including but not limited to handling, storage and application of materials; and job site safety precautions. If these specifications differ from the manufacturer's requirements, the more stringent provisions shall apply.
B. The membrane shall be thoroughly washed, cleaned, dried and primed prior to applying the seam tape or lap cement in strict accordance with the manufacturer's recommendations and guidelines.

C. All membrane field seams and flashings shall be left uncovered by pavers until an inspection has been performed and work has been approved in writing by the Contracting Officer and manufacturer's technical representative.
D. Never apply more adhesive than can be properly covered up by membrane or flashing prior to setting up.
E. Install only as much roofing material as can be completed and covered in accordance with specified requirements in one day.
F. Do not traffic over or stack roofing equipment or materials on completed new roofing surfaces, without adequate protection with 1/2 inch plywood.
G. Do not apply roofing materials before sunrise, and when there are indications of moisture present (rain, mist, dew, frost, and snow).
H. Install recover board without bridging.
I. Apply roofing membrane so direction of water flow is over, and not against membrane laps.
J. Ensure fishmouths and wrinkles within 6" of a lap are cut and patched with uncured membrane.
K. When using mechanical adhesive dispensing equipment, always be sure that all orifices are open when being dispensed.
L. All membrane laps shall be lightly pressed and rolled together to remove all air bubbles.
M. Install temporary water cut-offs, at the end of work each day, where roofing membrane does not abut a wall, wood edge member, or expansion joint. Remove water cut-offs cleanly when work is resumed.
    1. If breaks occur in water cut-offs or other part of roofing membrane and water damages roof insulation, remove damaged roof insulation and replace with new materials.
    2. Make every attempt to install flashing at openings, projections, and walls adjoining new roofing every day or work period. If circumstances do not permit, make areas watertight at end of each day or work period.
N. Cold weather precautions shall be followed. Store adhesives, sealants, and seam tapes in a heated environment, above 60 degrees, up to one hour immediately prior to installation. Be aware of wind chill temperatures on materials. Do not use or apply materials when colder than manufacturer's published limits.
O. Any water-based products that experience freezing temperatures during storage or application and prior to curing, shall be removed, discarded and replaced.
P. Contractor shall supervise the installation of and be responsible for:
    1. Proper installation of sheet metal, mechanical and other related work.
    2. Repairs to damaged areas, even if caused by other trades. Contractor shall advise the Contracting Officer in writing of all potential leaks as may be caused by other trades.
    3. All other work under this contract.

3.5 PREPARATION OF SURFACE AND MATERIALS:

A. PENETRATIONS:
    1. Vents and other projections through the roof shall be properly secured in position to prevent horizontal or vertical movement.
    2. Prior to completed flashing, penetrations through the deck shall be made watertight with temporary flashings.
    3. Wood nailers shall be furnished and anchored to the roof deck where sheet metal flanges and metal curbs are to be installed.
B. BASEFLASHING SURFACES:

1. Where the existing substrate is contaminated, compromised or otherwise rendered inadequate to receive the new flashing, provide ¼" minimum glass mat-faced treated gypsum core panel over the existing substrate, fastened along the top and bottom edges into the studs below. For walls or curbs that exceed 24", provide additional rows of fasteners spaced a minimum of 12" o.c.

3.6 WOOD NAILERS, BLOCKING & CURBS:

A. Provide a 1/4" gap between each section of wood blocking. Terminate nailers at control joints and expansion joints.
B. Fastener heads and washers shall be recessed 3/4" into the 1st wood nailer.
C. Place fasteners and washers in a staggered pattern, spaced to provide the minimum uplift resistance as specified. Contractor shall consider the safety factor for the fastener and substrate being attached to. Minimum spacing shall be 48" on center and 24" on center maximum within 8' of the corners.
D. Fasten subsequent nailers with nails or screws of sufficient length to penetrate the base wood blocking by 1-1/4". Space fasteners 24" on center, staggered in double rows. Install nails at an angle. Use #12 wood screws for parapet applications in lieu of nails.
E. Before roofing commences, all carpentry such as wood nailers, wood curbs and similar items shall be installed.
F. Curbs shall be a minimum of 8" above the membrane surface and as shown in details.
G. Secure square curbs with 3" X 3" "L" shaped brackets, 22 GA., 2 per side.

3.7 ROOF DRAINS:

A. Carefully remove existing clamping ring and clean debris from surfaces. Examine drains for defects, i.e. broken stem bolts, cracked bowls or broken clamping rings, and repair or replace components as needed. Test drains to assure proper drainage and clear obstructions if necessary. Over the drain bowl, install roof membrane (except surfacing material). See flashing section below.

3.8 RIGID INSULATION:

A. Roof System:
   1. Replace damaged insulation board with like kind.
   2. Fill any gaps larger than 1/4" with slivers of rigid insulation board
   3. Over the existing insulation, install a single layer of recover board loose laid.
B. General:
   1. All insulation installed must be covered by completed roofing membrane at the end of each day.
   2. Follow roofing manufacturer's recommendations for handling and installation procedures.
   3. Stagger all joints of overlay board from joints of existing insulation. Stagger short joints of recover board a minimum of 12"

3.9 SINGLE-PLY ROOFING MEMBRANE:

A. Furnish and Install a non-reinforced 60 mil loose laid EPDM single-ply membrane system as specified.
B. General:
   1. All mating surfaces shall be cleaned with unleaded gasoline or splice wash and clean white cotton rags and primed with lap splice primer.
C. Field seams shall be fabricated using 3" seam tape and then covered with 5" cover strips.

1. Vertical Flashing Seams shall be a minimum of 6" wide and also covered with a 5" semi-cured EPDM cover strip.
2. Field and factory "tee" seams shall be covered with a 12" X 12" uncured EPDM patch with edges sealed with lap caulking.
3. Base tie-in details may be performed with a reinforced securement strip (RSS) or anchor bar. The RSS shall be bonded to the recover board AND fastened with screws and plates per the manufacturer's recommendations.
4. Products shall be installed in strict accordance with the manufacturer's Roofing System Application Procedures and Roofing Systems Specifications.
5. If there is a conflict between these specifications and the manufacturer's minimum requirements, the more stringent specifications shall apply.

D. Water Cut-Offs
1. At the end of each day's work, temporary water cut-offs shall be installed at each tie-in.
2. The existing membrane shall be washed with wet rags and allowed to dry.
3. Contractor shall utilize the necessary means to effect a watertight tie-in that will not fail as a result of shrinkage of the existing membrane.
4. Apply a continuous bead of water cut-off mastic over the existing PVC membrane, approximately 6" from the edge.
5. Extend the new membrane onto the existing PVC membrane, making contact with the water cut-off mastic and seal the remaining lap splice with contact adhesive.
6. Over the tie-in, install wood or metal batten strips with gaps in between to allow for drainage.
7. Water cut-offs shall be completely removed when work is resumed.

E. FLASHINGS:
1. Curb Flashings:
   a. Where existing counterflashing is to remain, trim lip of metal flashing to provide a minimum 1" to 1-1/2" receiver for the new counterflashing.
   b. Prepare substrate to receive new membrane flashing materials. Do not apply adhesives and new flashing material to incompatible materials that would not be warrantable by the manufacturer.
   c. Furnish and install glass mat-faced treated gypsum core panel, thickness as indicated, over substrates that are incompatible or do not provide proper adhesion properties.
   d. Install new roofing membrane as required.
   e. Install new flashing membrane per detail drawings and in accordance with the manufacturer's recommendations. Base tie-ins may be performed with a reinforced securement strip (RSS). RSS strips shall be bonded to the rigid insulation as well as mechanically fastened per the manufacturer's recommendations.
   f. At all horizontal-to-vertical transitions, furnish and install a minimum 5" wide uncured EPDM cover strip over all vertical seams.
2. Wall Flashings:
   a. Remove sealant between lip of existing counterflashing and membrane flashing as required to remove baseflashing materials.
   b. The new EPDM flashing materials may be adhered to the existing concrete curbs and walls as prescribed by the manufacturer.
   c. Furnish and install new glass mat-faced treated gypsum board over existing wall board sheathing that has been damaged by removal of the existing roofing materials.

Secure the new wall sheathing board to the existing studs, with self-drilling dry-wall screws spaced 6” o.c. Max.

d. Extend the flashing membrane up and over the parapet wall, extending 1-1/2” below the joint between the wall and the wood nailer. Provide water-block mastic between the substrate and the new flashing membrane. Secure the membrane with the new continuous hook strip as prescribed by the manufacturer.

e. Furnish and install new counterflashing to cover and protect the top edge of the baseflashing. Overlap and interlock sections a minimum of 3" and seal laps with butyl sealant. Provide wind clips at 36” o.c. . Provide closures at all inside and outside corners and seal joints with sealant to a watertight condition.

f. Install new flashing membrane per detail drawings in accordance with the manufacturer's watertight guarantee guidelines and recommendations and these specifications.

F. Roof Jacks and Plumbing Vents:

1. Whenever possible, use pre-molded rubber flashings for roof projection flashings.
2. Pipes or conduits less than 1" in diameter shall be flashed with a hooded sealer pan. FIELD WRAPS WILL NOT BE ACCEPTABLE.
3. For sheet metal roof projection pans or other components with metal flanges, nail the flange to the wood nailer that is fastened to the deck (except for pre-molded pipe flashings, which do not require wood blocking below).

3.10 TRAFFIC AREAS:

A. Around each mechanical unit, roof scuttle, and pathways shown on the drawings, furnish and install interlocking rubber pavers over polyester fleece matting over the completed membrane, Glue the interlocking pavers together with all purpose sealant and band the edges with stainless steel "J" channel as indicated on the drawings.

3.11 EXPANSION JOINT COVERS:

A. Reconstruct expansion joints per detail drawings and manufacturer’s approved details.

3.12 JOINT SEALING SYSTEM:

A. Install Dow 123 Silicone Seal per detail drawings and manufacturer’s recommendations.

3.13 CLEAN UP:

A. The roofing contractor shall remove markings from finished surfaces. In areas soiled by mastics, glues or any other materials caused by work under this Section, consult the manufacturer of building materials for cleaning advice and conform to their instructions. The Contractor shall be responsible for all cleaning costs.

B. Upon completion of roofing work, the roofing contractor shall remove all remaining materials, debris, and leave building and worksite in a neat, clean and undamaged condition.

END OF SECTION 07530